

Ozone =  $O_3$

We want  $O_3$  up in the stratosphere BUT  
We don't want  $O_3$  in the Troposphere!

### Formation of $O_3$



It Keeps  
Replenishing  
Itself!

5.6.2 Describe the role of ozone in the absorption of ultraviolet radiation

• **ozone forms when UV hits oxygen molecules**

↳ Most forms @ equator & Bwt. the Tropics because these areas have the most sun

↳ Wind moves Ozone up toward poles where it concentrates.

→ Ozone "absorbs" incoming solar UV lightwaves.

The ozone is broken into  $O_2 + O$  in the process.

All of the O's get together to reform more  $O_3$  molecules.

$O_2$  joins back up with O → more  $O_3$

→ **Stratospheric Ozone keeps 95% of harmful UV from Earth.**

→ there is seasonal depletion @ the poles.

5.6.3 Explain the interaction between ozone and halogenated organic gases

### "The Hole in the Ozone"

#### Main Causes:

**Natural:** Volcanoes + Forest Fires produce Chlorine

**Man Made:** CFC's "chlorofluorocarbons" & other Halogens (Chlorine, Fluorine, & Bromine)

**"ODS"** AKA "Ozone Depleting Substances"

↳ Stick around Long Time

Very "Persistent" (CFC's - 65-385 yrs)

↳ Found in Coolants, propellants (in air conditioning & hair spray until Montreal Protocol)

**What?**

reduced concentration of  $O_3$  in the stratosphere, esp. @ the poles w/ seasonal trends

**How?**



notice in #2  
you  
end up with  
less  $O_3$

## Ozone 2

### 5.6.4 State the effects of ultraviolet radiation on living tissues and biological productivity

#### Animals

- UV-B associated w/ eye damage, cataracts, sunburn, & skin cancers
- UV-B also associated with decreased immunity

UV-B causes mutations which leads to cancers

#### Plants

- Some crops are UV-B sensitive → reduced yield
- Scientists may be able to develop UV-B resistant crops/trees

#### ⇒ Reduced Productivity

- In aquatic ecosystems phytoplankton live in upper water columns → damage during early life cycle.  
\* young are esp. @ risk

### 5.6.5 Describe three methods of reducing the manufacture and release of ozone-depleting substances

#### \* Alter human activity

- Replace gas-blown plastics
- Replace CFCs w/ CO<sub>2</sub>, propane or air as a propellant
- Replace aerosol propellants
- Replace methyl bromide pesticides

#### \* Regulate & Reduce Pollutants

- Recover & Recycle CFCs from refrigerators & air-conditioning
- Legislate to have refrigerators returned to manufacturer
- Capture CFCs from scrap cars
- Montreal Protocol

#### \* Clean up & Restore

- add ozone to or remove chlorine from stratosphere → NOT PRACTICAL
- Sunglasses + sunblock can protect eyes + skin



5.6.6 Describe and evaluate the role of national and international organizations in reducing the emissions of ozone-depleting substances

